

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

IN RE APPLICATION

ATTORNEY DKT NO: TS0777/US

OF: TROMMELEN ET AL.

CONFIRMATION No.: 9882

SERIAL NO. 10/508,908

GROUP ART UNIT: 1724

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EXAMINER: WU, IVES J

TITLE: BITUMINOUS COMPOSITIONS

DECLARATION UNDER 37 C.F.R. §1.132

I, Erik Trommelen, citizen of The Netherlands hereby declare:

That I received a bachelors degree in Chemical Engineering from H.A.S. in The Netherlands in 1986;

That I joined Kraton Polymers Research B.V. (formerly Shell Elastomers) in 1987 as a Chemical Engineer in the styrenic block copolymer group and have been working continuously in the field of styrenic block copolymers since that time;

That I am co-inventor in the current patent application U.S. Patent Application Serial No. 10/508,908;

That as one of the coinventors, I have knowledge of and am therefore fully conversant with regard to the technical field of the invention disclosed and claimed therein;

That I am familiar with the proceedings of the above mentioned patent application and have read the Office action of December 14, 2005, and the advisory actions of February 15, 2006 and August 31, 2006, including the Vonk and Agostinis references;

That at my direction, block copolymers SBSb1 and SBSb2, wherein S is styrene, B is butadiene, and b is also butadiene but with a lesser molecular weight than block B and having the molecular parameters set forth in Table 1 (attached hereto as Appendix I) were prepared by sequential polymerization;

That as can be seen in Table 1, both SBSb1 and SBSb2 have molecular weights and polystyrene contents within the range specified in the claims of the present patent application with the ratio between the first B block and the second b block also being within that of the claims of the present patent application as well;

That SBSb1 and SBSb2 differ from Polymer A of the present patent application in that the diene blocks are made up of butadiene, whereas the diene block in Polymer A in the Examples of the present patent application is isoprene;

That SBSb1 and SBSb2 were tested in PX-200 bitumen with regard to the various properties as shown in Table 2 (attached as a part of Appendix I) and in a manner similar to the experimental results in the present patent application;

That as can be seen in Table 2, the butadiene based copolymers SBSb1 and SBSb2 provide good rheological properties and good adhesive properties at a welding temperature of 21 °C but show poor tack and adhesive strength at a welding temperature of 4 °C;

That because of the poor results for T-peel at 4 °C, additional components would have to be added to bitumen compositions containing either SBSb1 or SBSb2 in order to obtain a satisfactory balance of performance characteristics in the bitumen composition;

That Polymer A, according to the present invention, is described in the present patent application on page 11, lines 27-30, and also reproduced below in Table 3 (attached as part of Appendix I);

That Experiment 7 of Table 2 in the present patent application, and also reproduced below in Table 4 (attached as part of Appendix I), shows experimental results of Polymer A with Bitumen A which indicate that good properties are obtained for R&B as well as T-Peel at 5°C;

That in with regard to the comparison of the comparative date and that of the present patent application, T Pell at 4 degrees C is comparable to T Pell at 5 degrees C since there is only one degree difference in the measurements;

That surprisingly, a satisfactory balance between the adhesive properties and rheological properties was obtained when Polymer A was used alone with bitumen; and

That therefore, a comparison of the comparative examples set forth herein and the Examples in the present patent application show that the bituminous composition according to the instant claims produces unexpected superior results since it is possible to obtain good properties without the addition of additional components which would be required with SBSb1 and SBSb2 polymers.

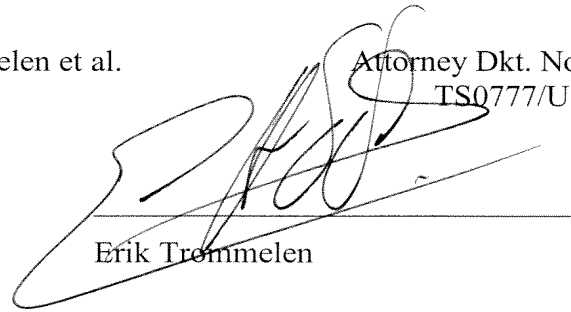
I, Erik Trommelen, further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

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Date: October 12, 2006



Erik Trommelen

## Appendix I

Table 1. Molecular parameters of SBSb polymers

| Parameters        | Block Copolymer SBSb1 | Block Copolymer SBSb2 |
|-------------------|-----------------------|-----------------------|
| Mw step 1 [g/mol] | 29500                 | 28300                 |
| Mw SB [g/mol]     | 286000                | 318000                |
| Mw SBS [g/mol]    | 339000                | 348000                |
| Mw SBSb [g/mol]   | 367000                | 376000                |
| Mw of B [g/mol]   | 256500                | 289700                |
| Mw of b [g/mol]   | 28000                 | 28000                 |
| Mw ratio of B/b   | 9.1                   | 10.3                  |
| Vinyl [%]         | 8                     | 48                    |
| PSC [%]           | 27                    | 26                    |

Table 2. Product properties of 12% SBSb in PX-200 bitumen

| Properties          | Block Copolymer SBSb1 | Block Copolymer SBSb2 |
|---------------------|-----------------------|-----------------------|
| Pen. Dmm            | 66                    | 77                    |
| R&B, °C             | 125                   | 126                   |
| Visco, Pa.s, 180 °C |                       |                       |
| 20 s <sup>-1</sup>  | 9.9                   | 7.1                   |
| 100 s <sup>-1</sup> | 8.2                   | 4.3                   |
| CB, pass °C         | -30                   | -25                   |
| Flow, pass °C       | 95                    | 100                   |
| T-peel, N-4 °C      | 1                     | 4                     |
| T-peel, N-21 °C     | 40                    | 66                    |
| T-peel, N-21 °C ++  | 44                    | 58                    |
| Tack at 4 °C        | Poor                  | Poor                  |
| Tack at 21 °C       | Good                  | Very Good             |

Table 3 – Block Copolymer A parameters

| Polymer A – SISI<br>Parameters | Values |
|--------------------------------|--------|
| Mw S [kg/mol]                  | 28.0   |
| Mw I [kg/mol]                  | 247.4  |
| Mw S [kg/mol]                  | 28.1   |
| Mw i [kg/mol]                  | 40.2   |
| PSC (wt %)                     | 22     |
| W                              | 6.2    |

Table 4: Inventive Example

| Test                 | Properties |
|----------------------|------------|
| Bitumen A            | 86         |
| Polymer A            | 14         |
| T-Peel at 5° C., N   | 38         |
| T- Peel at 21° C., N | 78         |
| R&B, ° C.            | 121        |
| DIN flow pass ° C.   | 100        |
| Cold bend, pass ° C. | -35        |